NATIONAL OPEN UNIVERSITY OF NIGERIA
University Village, NnamdiAzikiwe Expressway, Plot 91, Cadastral Zone, Jabi, Abuja
FACULTY OF SCIENCES

Department of Pure and Applied Science

JANUARY/FEBRUARY 2018 EXAMINATION

COURSE CODE: PHY311
COURSE TITLE: KENETIC THEORY AND STATISTICAL MECHANICS
COURSE UNIT: 3 units
TIME: 3 HOURS
ANSWER QUESTIONS ONE AND ANY FOUR OTHER QUESTIONS

Question 1

a. Explain briefly the three general types of ensemble. [9 marks]

b. Show that the Partition Function for individual particles of an Ideal Monoatomic Gas of volume V is given by:

$$Z = \frac{V}{h^3}(2m\pi K_B T)^{3/2}$$

[13 marks]

Q2. a. Calculate C_f for copper, given density=9gcm ^{3} , atomic weight = 63.5 and valency equal to one.
5 marks

b. state the multiplication rule 5 marks

c. Four coins are flipped in succession. Find the total number of possible outcomes. 5 marks

Q3.

a) Seven physicists assembled for a meeting shake hands with one another. How many handshakes take place?
8 marks

b. list the concepts of statistical mechanics in order of dependence. 7 marks

Q4.

a) Explain the three types of ensemble in detailed form. 9 marks

b) List three (3) factors in which partition function is applicable. 6 marks

Q5.

a) State equipartition theorem. 5 marks

b) What are the three types of degree of freedoms? 5 marks

c) Explain classical statistics. 5 marks

Q6. (a) An unbiased die is rolled; 9 marks

(i) Write down the sample space for the experiment

(ii) n coins are tossed, what is the sample space

(b) Two coins are tossed. What is the probability that : 6 marks

(i) Two head appears (c) at least one tail appears.